5.8 Noise

This section discusses the potential noise impacts that may result from construction and operation of the Amended Project. It evaluates the potential for impacts to both noise-sensitive off-site receptors and to onsite workers. As required by California Energy Commission (CEC) regulations, a 25-hour noise survey was conducted to establish background noise levels in the Project area. Because the transmission lines that will connect the Project to the regional grid have already been permitted and no changes are proposed as part of the Amended Project, transmission line noise is not addressed in this section.

5.8.1 Summary of Differences between Amended Project and Original SSU6

The primary noise and vibration issues associated with the original project involved steam blows, pile driving near wildlife habitat areas during mating and nesting seasons, and other noisy construction activities, such as the use of heavy equipment. Despite these activities, no significant adverse noise impacts were expected and thus no mitigation measures were required. However, the SSU6 Conditions of Certification included measures to reduce project noise levels and minimize their effects on nearby sensitive receptors.

The noise sources and emissions from the construction and operation of the Amended Project will be similar to those of the originally proposed SSU6 project. Pile driving still is planned beneath foundations of heavy Project equipment (i.e., in the power block). However, the power block area of the Amended Project, pile is located in the center of the 160-acre plant site, which is further from potential sensitive receptors than was the case for the original Project power block on its smaller 80-acre site. The increased distance of pile driving from sensitive receptors would reduce potential pile driving noise impacts. Because the Amended Project will involve similar noise-emitting activities to the original project, the Project would have no significant noise impacts. The Amended Project will employ measures similar to those identified in the Conditions of Certification (COC) for SSU6 to reduce Project noise levels.

5.8.2 LORS Compliance

Table 5.8-1 and the immediately following text summarize the LORS for noise that apply to the Amended Project. The Amended Project will comply with applicable LORS during construction and operation. The nature of noise, applicable acronyms and other terms are explained in Section 5.8.3.1, Noise Terminology.

Table 5.8-1 LORS Applicable to Noise

LORS	Applicability	Where Discussed in AP
Federal:		
Federal Noise Control Act of 1972 (40 Code of Federal Regulation [CFR] 204)	Regulates noise emissions from operation of construction equipment and facilities; establishes noise emission standards for construction and other categories of equipment and provides standards for testing, inspection, and monitoring of such equipment. Gives states and municipalities primary responsibility for noise control.	Section 5.8.4
U.S. Fish and Wildlife Service, Riparian Bird Species	Establishes maximum permissible noise levels to which certain riparian bird species may be subjected to during mating and nesting seasons.	Section 5.3.4 (Biological Resources)
State:		
Government Code Section 65302(g)	Requires counties to draft a noise element as part of the general plan to establish acceptable noise limits.	Section 5.8.4
CEQA, Public Resources Code (PRC) 2100 et seq.14 and CEQA Guidelines, California Code of Regulations (CCR) Title 14, Section 15000 et seq.	The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. CEQA Guidelines define a significant effect on the environment as one that will "increase substantially the ambient noise levels for adjoining areas."	Section 5.8.4
20 CCR Division 2, Appendix B(g)(4)(A)	Defines the potential noise impact area to be that area in the community where there is a potential for a total noise increase of 5 decibels absolute (dBA) or more at noise-sensitive receptors.	Section 5.8.4
CCR Title 24, California Noise Insulation Standards	Establishes a maximum interior noise level of 45 dBA CNEL, with windows closed, due to exterior noise sources, for dwellings other than detached single-family dwellings.	Section 5.8.2.3
8 CCR Section 5095 et seq.	Establishes Cal-OSHA employee noise exposure limits. These standards are equivalent to the Federal OSHA standards. Worker noise exposure limited to 90 dBA over an eight-hour work shift. Areas where worker noise exposure exceeds 85 dBA must be posted as a noise hazard zone and a hearing conservation program is required.	Section 5.8.4

Table 5.8-1 LORS Applicable to Noise

LORS	Applicability	Where Discussed in AP
Local:		
Imperial County General Plan, Noise Element	Provides a program for incorporating noise issues into the land use planning process, with a goal of minimizing adverse noise impacts to receptors that are sensitive to noise. Identifies existing and future noise sources and defines noise-sensitive land uses. Establishes goals, objectives, and procedures to protect the public from noise intrusion. Discourages the development of noise-generating activities near noise-sensitive land uses. Requires analysis of current and projected noise levels to include industrial plants. Provides interior noise standards in addition to CCR Title 24, California Noise Insulation Standards.	Section 5.8.4
Imperial County General Plan, Geothermal and Transmission Element	Provides criteria for the control of noise from geothermal facilities. The maximum permitted continuous sound level is 60 dBA community noise equivalent level (CNEL) at the nearest residence.	Section 5.8.4
Imperial County Code, Title 9, Division 7, Chapter 2 (Noise Ordinance)	Noise ordinance specifies sound level limits for industrial noise at 70 dBA equivalent continuous noise level (Leq) on or beyond the boundary of the property line anytime.	Section 5.8.4

5.8.2.1 Federal LORS

There are no Federal LORS directly regulating offsite (community) noise. Federal regulations applicable to the Amended Project have been incorporated into state and local requirements. EPA noise guidelines have been considered in developing local requirements.

The U.S. Fish and Wildlife Service (USFWS) has established a level of 60 dBA Leq as the maximum permissible noise level to which certain riparian bird species may be subjected during the mating and nesting seasons (see Section 5.3, Biological Resources).

5.8.2.2 State LORS

The California State Government Code requires counties to draft a Noise Element for their General Plan to establish acceptable noise limits for various land uses in the county. The Imperial County General Plan contains a Noise Element.

The California Occupational Safety and Health Administration (Cal-OSHA) has adopted occupational noise standards. The noise exposure level of workers is regulated at 90 dBA over an 8-hour shift to protect hearing (8 CCR Section 5095 et seq.). Onsite noise levels will generally be in the 70 to 85 dBA range. Onsite Project areas above 85 dBA will be posted as high noise level areas and hearing protection will be required in these work areas and the 8-hour exposure levels below 90 dBA will be maintained.

5.8.2.3 Local LORS

Imperial County

The applicable Imperial County noise LORS for the Amended Project includes the Noise Element and Geothermal and Transmission Element of the County General Plan, and a County Noise Ordinance.

General Plan

Noise Element

The Noise Element of the Imperial County General Plan examines noise sources and provides information to be used in setting land use policies to protect noise sensitive land uses, and for developing and enforcing the County Noise Ordinance. The Noise Element provides a program for incorporating noise issues into the land use planning process, with a goal of minimizing adverse noise impacts to noise sensitive receptors. It identifies industrial sources, including geothermal plants, as one of several principal noise sources in the County. The Element identifies the location of existing and future planned geothermal plants in the southeast Salton Sea area to be generally located away from concentrations of sensitive receptors.

The Noise Element identifies Noise Impact Zones where sensitive receptors are likely to be exposed to significant noise (greater than 60 dB CNEL or 75 dB Leq) from roadways, railroad, airports, and agricultural activities. Any property within one-quarter mile (1,320 feet) of existing farmland that is in an agricultural zone is within a Noise Impact Zone. The Amended Project is in a Noise Impact Zone due to its location in an agricultural zone. An acoustical analysis is required for any action that would be located, all or in part, in a Noise Impact Zone.

When an acoustical analysis is performed, conformance with the County Noise/Land Use Compatibility Guidelines, provided in the Noise Element, is used to evaluate potential noise impacts and provide criteria for environmental impact findings and conditions for project approval. Land use compatibility defines the acceptability of a land use in a specified noise environment. For residential land uses, these guidelines categorize noise levels of up to 60 dBA Ldn or CNEL as “normally acceptable” up to 60 dBA Ldn or CNEL and up to 70 dBA Ldn or CNEL as “conditionally acceptable”.

According to the Noise Element, if future noise levels from a proposed action are within the “normally acceptable” noise level shown in the County Noise/Land Use Compatibility Guidelines but result in an increase of five dBA CNEL or greater, the action would have a potentially significant noise impact, and mitigation measures would need to be considered. If the future noise level after the action is completed is greater than the normally acceptable noise level, a noise increase of three dBA CNEL or greater should be considered a potentially significant noise impact, and mitigation measures would need to be considered. The Noise Element also establishes interior noise levels to be considered in acoustical analyses. The interior noise standard for detached single-family dwellings is 45 dBA CNEL.

The Noise Element identifies construction noise standards. Construction noise, from a single piece, or a combination of equipment should not exceed 75 dBA Leq at the nearest sensitive receptor, when averaged over an eight hour period (for day/week duration) or over a one hour period (for extended duration), Construction is limited to 7:00 A.M. to 7:00 P.M. Monday through Friday, and 9:00 A.M. to 5:00 P.M. on Saturday. No construction is permitted on Sunday or holidays.

Geothermal and Transmission Element

This element of the General Plan establishes noise control criteria for geothermal facilities. The maximum permitted continuous sound level under the element at the nearest receptor is 60 dBA CNEL. Drilling noise is controlled by the following standards applicable to the Amended Project:

- The drilling operator must limit drilling noise to 60 dBA CNEL at the nearest human receptor. The noise level may be exceeded by 10 percent if the noise is intermittent and during the daytime hours.
- Impulse noises, such as sudden steam venting, must be controlled by discharge through a muffler or other sound-attenuating system.
- Drilling may be conducted on a 24-hour basis provided the above standards are met.

County Noise Ordinance

Imperial County enforces construction and operation noise standards specified in the Noise Element through the Noise Ordinance. Noise-generating sources in the County are regulated under the County's Codified Ordinances, Title 9, Division 7 (Noise Abatement and Control).

The Noise Ordinance limits the hours of construction and the level of noise emitted by the construction activities. Construction noise from a single piece of equipment or a combination of equipment should not exceed 75 dBA Leq, averaged over an eight-hour period, at the nearest sensitive receptor. This assumes a construction period of days or weeks, relative to an individual sensitive receptor. For extended length construction times, construction may not exceed 75 dBA Leq averaged over a one-hour period. Construction equipment operation must be limited to the hours of 7:00 A.M. to 7:00 P.M., Monday through Friday, and 9:00 A.M. to 5:00 P.M. Saturday. No commercial construction operations are permitted on Sunday or holidays.

Under Section 90702.00 Sound Level Limits, the Ordinance limits operational noise levels in various land uses zones during the day, evening, and night. Property line noise limits apply to noise generation from one property to an adjacent property. The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. Noise limits at the property line are shown in Table 5.8-2.

Table 5.8-2 Imperial County Property Line Noise Limits

Zone	Time	Hourly Average Sound (dBA)
	7:00 A.M. to 10:00 P.M.	50
Residential	10:00 P.M. to 7:00 A.M.	45
	7:00 A.M. to 10:00 P.M.	55
Multi-residential	10:00 P.M. to 7:00 A.M.	50
	7:00 A.M. to 10:00 P.M.	60
Commercial	10:00 P.M. to 7:00 A.M.	55
Light Industrial/Industrial Park	Anytime	70
General Industrial	Anytime	75

Table 5.8-2 Imperial County Property Line Noise Limits

Zone	Time	Hourly Average Sound (dBA)
Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB Leq.		

From Table 5.8-2, sound level limits for industrial noise are set at 75 dBA Leq on or beyond the boundary of the property line anytime. Subsection C addresses compliance for transmission facilities:

> "C. Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of subsection A of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located."

5.8.2.4 Involved Agencies

A local agency contact for noise-related issues is identified in Table 5.8-3.

Table 5.8-3 Agencies and Agency Contacts

Agency Contact	Phone/E-mail	Permit/Issue
Jurg Heuberger, Director Imperial County Dept. of Planning & Development 801 Main Street El Centro, CA 92243	(760) 482-4310 jurgheuberger@imperialcounty.net	Compliance with County noise requirements (e.g., General Plan Noise Element, Noise Ordinance)

5.8.2.5 Required Permits and Permit Schedule

No specific noise-related permits will be required for the Amended Project. However, the Project will be required to comply with the applicable requirements of Imperial County (compliance with the County Noise Ordinance and with the Noise Element and other applicable elements of the Imperial County General Plan).

5.8.3 Affected Environment

This section discusses the existing noise environment of the Amended Project site (plant site, injection well pads, and associated pipelines). Existing noise sensitive receptors, noise sources, and the ambient noise environment are identified.

5.8.3.1 Noise Terminology

Noise is generally defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment. Noise levels are measured as decibels (dB) on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, doubling

the energy of a noise source (e.g., traffic volume) would not double the noise level, but would instead increase noise levels by three dB. In addition, the human ear is not equally sensitive to all frequencies within the sound spectrum. Sound heard by the human ear is typically characterized by the "A weighted" sound level (dBA), which filters out noise frequencies not audible to the human ear, thereby weighting the frequencies audible by humans. Table 5.8-4 provides typical instantaneous noise levels of common activities in dBA.

Table 5.8-4 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 1,000 feet	100	
Gas Lawn Mower at 3 feet	90	
Diesel Truck at 50 feet, at 50 mph	80	Food Blender at 3 feet Garbage Disposal at 3 feet
Noisy Urban Area, Daytime Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area Heavy Traffic at 300 feet	60	Normal Speech at 3 feet
Quiet Urban Daytime	50	Large Business Office, Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing
Source: Caltrans 1998		

In addition to instantaneous noise levels, noise levels are measured and averaged over a period of time to assess noise limits and impacts. Typically, noise levels are averaged over one hour and expressed as dBA Leq, the equivalent one-hour noise level. Time of day is also an important factor for noise assessment; noise levels that may be acceptable during the day may interfere with the ability to sleep during evening or nighttime hours. Therefore, noise levels are averaged over a 24-hour period to represent a community noise equivalent level (CNEL), which is the cumulative noise exposure in a community during a 24-hour period. CNEL adds five dBA to measured evening sound levels (between 7:00 P.M. and 10:00 P.M.), and 10 dBA to the measured nighttime sound levels (between 10:00 P.M. and 7:00 A.M.). The day/night average sound level (Ldn) is the same as CNEL, except the evening period is included in the daytime period.

5.8.3.2 Sensitive Noise Receptors

The County defines sensitive noise receptors as areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment. Sensitive receptors include, but are not limited to, residences, schools, hospitals, parks, and office buildings. Excessive exposure to noise can result in adverse physical and psychological responses; can interfere with sleep, speech, and concentration; and/or can generally diminish quality of life.

The Amended Project site and surrounding areas are almost entirely agricultural and industrial. As a result, there are no noise sensitive land uses located in the immediate proximity to the Project site. The nearest residence is the park ranger residence at the Sonny Bono National Wildlife Refuge (Wildlife Refuge) headquarters, located approximately 0.8 mile from the plant site. The residence is situated on land zoned as recreational/open space, which is not adjacent to the Project site. There are no other residences located near the Project site that would be potentially impacted by Project noise. In addition to human noise sensitive receptors, some protected animal species and their habitats may be considered sensitive noise receptors if located near construction and operational noise sources, especially during the species' breeding seasons. Many riparian bird species are sensitive to excessive noise.

The Project site is located within an area where there is potential for special-status wildlife species. This includes land in agricultural use where burrowing owls have been observed, as well as the nearby the Sonny Bono National Wildlife Refuge (Wildlife Refuge), where there is habitat for federally endangered species such as the Yuma clapper rail. Excessive noise levels during mating or nesting seasons can be detrimental to the Yuma clapper rail. See Section 5.3, Biological Resources, for a discussion of potential impacts.

5.8.3.3 Noise Environment

Regional Setting

The Project site is located in Imperial County on the southeast side of the Salton Sea, near Obsidian Butte and the Wildlife Refuge. The proposed Project is situated in a remote area of undeveloped land and land developed for agriculture and industrial uses, including geothermal power plants and manufacturing. The Project site is close to several existing geothermal power plants that are similar to the proposed Project. The nearest community is the town of Calipatria, approximately six miles southeast of the Project site.

Plant Site

The Project site is to be located on a 160-acre agricultural parcel bounded by gravel and dirt roads, including McKendry Road to the north, Boyle Road to the east, Peterson Road to the south, and Severe Road to the west. The land use of the Project site is currently agricultural; surrounding land uses include undeveloped land to the north and west, agricultural land to the south, and industrial land to the east. Noise sources in proximity to the Project site include activities from adjacent agriculture and geothermal power production facilities. Nine existing geothermal power plants are located within two miles of the Project site.

The nearest human noise sensitive receptor is the ranger's residence at the Wildlife Refuge Headquarters, approximately 4,000 feet northeast of the Project site. Noise sources at the residence are vehicular traffic

on Sinclair Road accessing the Wildlife Refuge Visitors Center, farm equipment operating in the area, and the operation of the nearby geothermal plants.

Offsite Facilities

The three proposed injection well pad sites are located south and southeast of the Project plant site (see Figure 5.8-1). As shown on the figure, brine injection pipelines will extend from the plant site to each of these injection well pads.

5.8.3.4 Noise Levels

Ambient Noise Levels

Existing ambient noise levels were measured at the Project site and nearest residence on August 20 – 21, 2008. One 25-hour measurement (per CEC AFC requirements) was taken at the nearest residence (R) over a 25-hour period from 1:30 P.M. August 20 to 2:30 P.M. August 21, 2008. Seven short-term daytime measurements (1-7) were taken during the same 25-hour period, four at the perimeter of the Project site (three at the proposed production well locations), and one at each of the three injection well locations southeast of the Project site. Noise measurement locations are shown on Figure 5.8-1.

During the measurements, the weather was clear, dry, and very hot. Wind speeds were less than five miles per hour. Two Larson-Davis sound level meters were used to collect noise data: Model 820 for the 25-hour measurement and Model 720 for the short-term (10-minute) measurements. The meters were mounted on tripods approximately five feet above ground level to simulate the average height of the human ear. All measurements were taken at the edge of gravel or dirt roads. Sound level meters were calibrated before and after the measurements. The dominant source of noise in the area observed during the short-term measurements was the operation of several geothermal plants, one of which is adjacent to and east of the Project site. Occasional vehicles passed on the roadways where noise measurements were taken. The results of the short-term measurements are summarized in Table 5.8-5.

Table 5.8-5 Ambient Noise Measurements

Measurement #	Measurement Location	Leq	Lmin	Lmax
R	Residence at Ranger Station	55	33	80
1	Plant Site Southern Perimeter	49	47	58
2	Plant Site Production Well (OB-1)	56	45	68
3	Plant Site Production Well (OB-2)	50	42	72
4	Plant Site Production Well (OB-3)	46	43	57
5	Injection Well (OB-1)	48	38	68
6	Injection Well (OB-2)	58	45	79
7	Injection Well (OB-3)	47	60	41
Notes: R = Residence All sound levels expressed as dBA.				

Based on the data in Table 5.8-5, short-term ambient noise levels vary considerably at the Project site depending on proximity to existing noise sources. Noise levels were higher when measured adjacent to the existing geothermal plants and active adjacent roadways.

The results of the 25-hour noise measurements taken at the nearby residence are summarized in Table 5.8-6.

Table 5.8-6 25-Hour Ambient Noise Measurement - Hourly Data

Date	Hour	dBA Leq
August 19, 2008	1:00[1] P.M.	57
August 19, 2008	2:00 P.M.	57
August 19, 2008	3:00 P.M.	55
August 19, 2008	4:00 P.M.	54
August 19, 2008	5:00 P.M.	51
August 19, 2008	6:00 P.M.	51
August 19, 2008	7:00 P.M.	59
August 19, 2008	8:00 P.M.	53
August 19, 2008	9:00 P.M.	53
August 19, 2008	10:00 P.M.	52
August 19, 2008	11:00 P.M.	49
August 20, 2008	12:00 A.M.	46
August 20, 2008	1:00 A.M.	44
August 20, 2008	2:00 A.M.	41
August 20, 2008	3:00 A.M.	43
August 20, 2008	4:00 A.M.	44
August 20, 2008	5:00 A.M.	47
August 20, 2008	6:00 A.M.	47
August 20, 2008	7:00 A.M.	47
August 20, 2008	8:00 A.M.	44
August 20, 2008	9:00 A.M.	60
August 20, 2008	10:00 A.M.	60
August 20, 2008	11:00 A.M.	60
August 20, 2008	12:00 P.M.	58
August 20, 2008	1:00 P.M.	52
August 20, 2008	2:00[2] P.M.	54
Loudest Hour		60

Table 5.8-6 25-Hour Ambient Noise Measurement - Hourly Data

Date	Hour	dBA Leq
Quietest Hour		41
24-Hour		55
1. The 13:00 measurement on 8-19-2008 began at 1:31 P.M. 2. The 14:00 measurement on 8-20-2008 ended at 1:31 P.M.		

As shown on Table 5.8-6, based on the 25-hour measurement, the quietest period at the ranger residence occurred between 2:00 A.M. and 2:59 A.M., with the lowest measured noise level at 41 dBA Leq and a corresponding L90 value of 39.5 dBA. The corresponding ambient CNEL for the 24-hour period is 57 dBA CNEL.

Operational Plant Noise Levels

On October 29, 2008 at 3:00 P.M., short-term (10-minute) noise measurements were taken at three key noise sources of an existing operational geothermal power plant (Unit 4) in the vicinity of the Project Site This facility's facilities and equipment are similar to those of the Amended Project. These measurements provide a reference noise level for predicting the operational noise levels of the Amended Project. The results of the plant noise measurements are shown in Table 5.8-7.

Table 5.8-7 Operational Plant Noise Measurements

Measurement #	Measurement Location	Leq	Lmin	Lmax
1	Turbine House	68	66	70
2	High-Pressure Separator	74	72	76
3	Drilling Rig	67	64	76
All sound levels expressed as dBA; measured at approximately 50 feet from source, except the drilling rig, which was taken at 300 feet.				

Operational noise levels for the proposed plant were modeled to generate noise contours radiating out from the plant for comparison to the location of sensitive receptors (i.e., the residence at the Wildlife Refuge).

5.8.4 Environmental Impacts

Significance Criteria

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of the CEQA Guidelines sets forth characteristics that may signify a potentially significant impact:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards (LORS) of other agencies;
- Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;

- Substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project; or
- Substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

According to the CEC's interpretation of these criteria, a significant noise impact results when noise produced by a permitted power-producing facility causes an increase of more than 10 dBA in the background noise level (L90) at a noise sensitive receptor during the quietest hours of the night. In contrast, an increase of less than 5 dBA is typically considered an insignificant impact, while an increase from 5 to 10 dBA may be considered significant, depending on the specific circumstances.

Noise due to construction activities is usually considered less than significant under CEQA if: 1) the construction activity is temporary; 2) use of heavy equipment and noisy activities is limited to daytime hours; and 3) all feasible noise abatement measures are implemented for noise-producing equipment.

For analysis of the noise impacts of the Amended Project, noise levels would be considered significant if:

- Construction noise exceeded 75 dBA Leq, measured over an eight-hour period at any residential receptor;
- Power plant operations increased noise by 10 dBA above the lowest measured L90 at any noise sensitive receptor; or
- Power plant operations exceeded 60 dBA CNEL at the nearest noise sensitive receptor.

In addition, the County provides guidelines to determine if an increase in ambient noise levels results in a significant impact. According to the Noise Element, if the future noise levels from the action are within the "normally acceptable" noise level shown in the County Noise/Land Use Compatibility Guidelines, but nonetheless result in an increase of five dBA or more CNEL, the action would have a potentially significant noise impact, and mitigation measures must be considered. If the future noise level after the action is completed is greater than the normally acceptable noise level, a noise increase of three dBA CNEL or greater is a potentially significant noise impact and mitigation measures must be considered.

Ground-borne vibration generated by the Project would be imperceptible at approximately 300 feet from the vibration source. Since the nearest sensitive human receptor (residence) is approximately 4,000 feet from the Project site, there will be no vibration impacts at this location.

5.8.4.1 Construction

Construction noise would be generated from construction activities at the plant site, well pads and pipelines, borrow site, and from construction-related traffic to/from these areas.

Construction of the power plant and associated facilities (including the short water supply pipeline that extends from the adjacent Imperial Irrigation District [IID] irrigation canal), would result in a short-term, temporary increase in the ambient noise level at the Project site due to operation of construction equipment and vehicles, which would include well drilling. Construction would occur during a typical workday of 7:00 A.M. to 7:00 P.M. on weekdays and possibly Saturdays, and to exclude Sundays and holidays. The possible need for night work might occur be due to worker safety considerations during extremely high

midday temperatures in the summer months. Night construction could occur with the approval of a variance to the County Noise Ordinance.

The magnitude of construction noise levels generated would be based on the type of construction activity, type and number of pieces of equipment, duration of the construction phase, and the distance between the noise source and receptor and any intervening topography and/or structures. Excluding periods during which pile driving would occur, noise levels of typical construction equipment are short-term and range from 70 to 85 dBA L_{max} at 50 feet from the source (Thalheimer 2000). Instantaneous sound levels from typical pile driving techniques may be as high as 105 dBA at 50 feet (USEPA 1972). Instantaneous construction sound levels are averaged over a period of time (typically one hour) for impact assessment. Construction activities on a job site can be stationary and mobile, and are typically assessed as a point source at a reference distance from the center of the site activity. Due to the nature of the Project's anticipated construction activity, with breaks and repositioning of equipment, hourly construction noise levels are expected to average no more than 95 dBA Leq at 50 feet from the centroid of each work area.

Noise from a point source attenuates at an approximate rate of 6 dBA per doubling of distance over acoustically hard ground, such as pavement, assuming that no intervening topography or structures act as a noise barrier. Over acoustically softer ground, noise attenuates at a slightly greater rate of 7.5 dBA per doubling of distance. This latter value is applicable in this case as the Project site is open, the topography is flat, and the site is surrounded by tilled fields.

The earthen berm proposed for flood control around the plant site would also serve as a partial noise barrier to Project noise emissions leaving the site. However, barriers are most effective in attenuating noise when they are adjacent to the noise source and/or receptor. The berm would have a limited effect on reducing noise generated from locations centrally located within the plant site (e.g., the power blocks of the three 53-MW units)). However, the berm would help attenuate onsite noise generated adjacent to the site's northwest perimeter, adjacent to offsite protected species habitat.

Plant Site

Construction activities at the plant would generate noise emissions from the use of construction equipment. The nearest sensitive human noise receptor (the residence at the Wildlife Refuge) to the Project site is approximately 4,000 feet from the northeast corner of the Project site. Typical short-term construction noise emissions of 85 dBA Leq at 50 feet from a source located at the northeast corner of the plant site would attenuate over a soft terrain distance of approximately 4,000 feet to approximately 38 dBA Leq at the residence. Pile driving construction noise emissions of 95 dBA Leq at 50 feet, located at the centroid of the plant site, would attenuate over a distance of approximately 6,000 feet to approximately 52 dBA Leq at the residence. Project construction noise would be below the County significance threshold limit of 75 dBA Leq, which is averaged over a more lenient eight-hour period. Therefore, no significant noise impacts would occur. As shown in Table 5.8-6, most of the daytime hourly ambient noise measurements at the residence currently exceed 50 dBA Leq; therefore, because differences in noise levels of less than three dBA are not perceptible to the human ear, Project construction noise levels of approximately 52 dBA would not be noticeable most of the time at the residence.

During power plant commissioning, piping would be cleaned by high-pressure steam (steam blows) during daytime hours over an approximately 72-hour period. Steam blows produce noise levels up to 118 dBA at a distance of 100 feet. A noise silencer can attenuate the steam blow by approximately 44 dB. Since a steam

blow silencer will be used, the resulting noise level at the nearest residence would be approximately 50 dBA, which would not be a concern during daytime hours.

Well Pads and Pipelines

Construction of the production and injection well pads will generate construction noise and temporarily increase ambient noise levels at the Project site and proposed well locations. Well pad development includes drill site preparation, well drilling, well flow testing, and well cleanout, all of which would generate construction noise in the range of approximately 75 to 79 dBA Leq at 100 feet from the center of the activity.

The nearest well pad to the residence at the Wildlife Refuge is production well pad (OB 3) in the northeast corner of the plant site, approximately 4,000 feet southwest of the residence. Construction noise from the nearest well pad development would attenuate with distance to less than 45 dBA Leq at the residence. As shown in Table 5.8-6, most noise measurements at the residence already exceed 50 dBA, so Project construction noise would not be noticeable most of the time. If the well pad construction activities would occur over a 24-hour period, and sustain this maximum continuous noise level over that period, the CNEL would be approximately 52 dBA, which is less than the 60 dBA CNEL standard for well pad development in the Imperial County Geothermal and Transmission Element. No significant noise impacts would occur from well pad development.

Construction of the proposed injection pipelines between the well pads and plant site would generate a short-term increase in ambient noise levels near the construction activity. Peak construction noise is estimated at 85 dBA at 50 feet from the activity, which, at its closest point to the residence, would attenuate to approximately 48 dBA at the nearest receptor, the residence at the Wildlife Refuge. Project construction noise levels would be less than the County's construction noise significance threshold. Also, as discussed above, Project construction noise emissions would attenuate over distance such that the incremental noise would be largely noticeable given the ambient noise levels at the residence. No significant impact would occur.

Vehicular Traffic

Construction of the proposed facilities would generate a short-term increase in vehicular traffic on roadways in the vicinity of the Project site (see Section 5.13, Traffic and Transportation). Construction traffic would consist of construction worker vehicle trips in the early morning and late afternoons (during somewhat increased vehicular noise levels occur during A.M. and P.M. peak commuting periods), and the delivery of construction equipment, vehicles, and building materials to the Project site along roadways in the Project vicinity including SR 86, SR 111, and Sinclair and Gentry Roads, which have several adjacent residences. However, this traffic would be temporary, and would occur during daytime hours on weekdays when people are less sensitive to noise intrusions. Therefore, construction-related traffic on local roadways would not result in significant impacts.

Construction Noise Summary

In summary, construction noise from the activities of the Amended Project would be less than significant because: 1) the construction activity is temporary; 2) use of heavy equipment and noisy activities will occur during daytime hours; and 3) feasible noise abatement measures will be implemented for noise-producing equipment. Project construction noise levels would not exceed the Imperial County Noise Ordinance

construction noise limit of 75 dBA Leq, measured over an eight-hour period at any residential receptor. Project construction noise levels also would attenuate over distance such there would be no noticeable increase in noise levels at the single residence of concern (the ranger residence at the Wildlife Refuge headquarters), most of the time, given the existing measured noise levels at the location. Construction noise levels of the Amended Project would not result in significant impacts.

5.8.4.2 Operation

Operational noise from the Amended Project would result from power plant and injection well pad operations and from operation-generated traffic.

Power Plant

Operation of the proposed facility would generate continuous noise levels 24 hours per day, seven days per week. The primary noise sources of geothermal power plants are the turbine/generator and the cooling towers, with various secondary noise sources including pumps and equipment associated with the separator. In addition, if emergency generators are operated, an additional substantial noise level would be temporarily generated; however, the generators would only be used during a power outage when the plant would not be operating. Additionally the generators would be enclosed by a noise-reducing structure, which would reduce noise levels to approximately 70 dBA at 50 feet. The overall noise generated by these various noise sources on the plant site would be based on the configuration of the sources, the number and power rating of the equipment, and any noise-reducing measures incorporated.

The operational noise levels measured at a similar geothermal power plant (Unit 4) were used for modeling operational noise levels of the Project. The SoundPlan Noise Prediction Model was used to estimate the operational noise levels. The Cadna A noise model predicts and assesses noise levels of industrial noise sources and uses industry standard propagation algorithms and sound level inputs from equipment manufacturers and operational sources. The model calculations account for sound wave divergence and attenuation factors such as absorption, ground effects, and barrier/shielding.

The results of the modeling are shown on Figure 5.8-2 as noise contours in 5 dBA Leq increments from 75 dBA Leq at the plant radiating out to 40 dBA Leq at the residence. The noise contour of 65 dBA Leq is located entirely within the plant site perimeter, which is less than the 75 dBA Leq industrial operational property line noise limit established by the Imperial County Noise Ordinance. Based on the distance of approximately 5,700 feet from the approximate centroid of the noise sources on the Amended Project site to the nearest residence (at the Wildlife Refuge), the modeled operational plant noise levels are estimated to attenuate over distance to approximately 40 dBA Leq (approximately 47 dBA CNEL) at the residence. As shown in Table 5.8-6, most noise measurements at the residence already exceed 50 dBA. Comparing this estimated noise level with the lowest measured L90 of 40 dBA at the quietest time of the night (2:00 A.M.) shows that there would be no increase over the existing lowest L90 noise level.

The CEC has interpreted the CEQA criteria such that an increase of less than five dBA would be considered an insignificant impact. Since the resulting noise level at the residence would represent no increase in dBA Leq, there would be no significant impact, The corresponding CNEL of the operation plant noise with the ambient noise levels at the residence would be below the 60 dBA CNEL limit of the County's Noise Element and Geothermal and Transmission Element. Accordingly, impacts would be less than significant

The corresponding CNEL for the modeled plant noise would be approximately 47 dBA CNEL at the residence, which when added to the measured ambient CNEL of 57 dBA CNEL, the resultant CNEL would be 58 dBA CNEL (when adding a 47 dBA noise level to a 57 dBA noise level, the resulting noise level is an increase of only one dBA). This would be a one dBA CNEL increase from the Project, which is less than the five dBA CNEL increase limit for significance set by the County's Noise Element and used by the CEC. The future CNEL with the Project of 58 dBA CNEL will be within the "normally acceptable" noise levels in the County's Noise/Land Use Compatibility Guidelines for residential use (60 dBA CNEL).

Project-generated Traffic

Operation of the Amended Project would generate a minor increase in vehicular traffic on local roads and area highways in the vicinity of the Project site (see Section 5.13, Traffic and Transportation). An estimated 138 vehicle trips would be generated by the operation of the proposed plant, which would access the Project site via Sinclair, Gentry, McKendry, and Boyle roads from SR 86 and SR 111. These increased traffic levels would be expected to result in an increase in noise levels along these roadways of less than three dBA, which is barely perceivable to the human ear. Therefore, operational traffic noise would not cause a significant impact.

Well Pad Operation

Noise from the production wells would occur due to a change in pressure as steam moves through the valves. Well pad noise has been measured at 75 dBA at five feet from existing wells. This well pad noise from the northernmost well pad in the north of the site would attenuate with distance (over 4,000 feet) to approximately 55 dBA at the nearest residence. Therefore, there would be no significant operational noise impacts from the well pads.

In summary, operation phase noise impacts of the Amended Project would be less than significant for the following reasons:

- The 60 dBA CNEL limit at the nearest noise sensitive receptor, as identified by CEC and the Noise and Geothermal/Transmission Elements of the Imperial County General Plan would not be exceed;
- The five dBA limit above the lowest measured L90 at any noise sensitive receptor, as identified by the CE would not be exceeded;
- The five dBA CNEL noise increase and the 60 dBA CNEL limit for residential land use set by the County Noise Element would not be exceeded; and
- The property line noise limits of 75 dBA Leq for land zoned industrial would not be exceeded.

5.8.4.3 Cumulative Impacts

Cumulative noise impacts include those impacts from the Amended Project combined with other past, present, and reasonably foreseeable future impacts. Of particular concern are those impacts that occur at the same time and in vicinity of each other. The Amended Project site is located approximately 3.4 miles from the site of the CHAR geothermal project. Other projects with potential noise impacts are even further away. At such distances, there would be no significant cumulative noise impact potential. Moreover, like the Amended Project, other future projects will be required to comply with applicable local noise

requirements. Together these factors ensure that the Project would not have cumulatively significant noise impacts.

5.8.5 Mitigation Measures

Noise mitigation measures are embodied in the CEC's Conditions of Certification (COC) for the original project. The Applicant proposes no changes to the existing noise COCs, as shown in the following section.

5.8.6 Conditions of Certification

The Commission Decision on the original SSU6 Project contained COC for noise. The Applicant proposes no changes to these COC at this time.

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one mile of the site and the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement, signed by the project manager, stating that the above notification has been performed, and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

Noise Complaint Process

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints.

The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, with the local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program. The project owner shall make the program available to OSHA and Cal-OSHA upon request.

Steam Blow and Pile Driving Management

NOISE-4 The project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 74 dBA measured at a distance of 100 feet. The project owner may conduct steam blows continuously, 24 hours per day, until completed.

The project owner shall ensure that noise from pile driving, measured at the occupied Yuma Clapper rail habitat at the northern and western boundaries of the power plant site, does not exceed 60 dBA L_{eq} hourly one-half hour before and one hour after daybreak (morning civil twilight) and sunset during the mating and breeding season (February 15 through August 31). Alternatively, the project owner may schedule pile driving so that it does not occur during the mating and nesting season (from February 15 to August 31).

Verification: At least 15 days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule. At least 15 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at the northern and western boundaries of the power plant site. Alternatively, this submittal may entail a description of the pile driving schedule, demonstrating that it does not occur between March 1 and August 31.

Steam Blow Notification

NOISE-5 Prior to the first steam blow, the project owner shall notify the occupants of the residence at the Sonny Bono National Wildlife Refuge headquarters facility. The project owner shall offer to temporarily relocate the occupants of that residence for the duration of the steam blows, and shall perform this relocation upon their acceptance. The notification may be in the form of a letter to the residence, a telephone call, a flier or other effective means. The notification shall include a description of the purpose and nature of the steam blow, the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: The project owner shall notify the occupants of the residence at the Sonny Bono National Wildlife Refuge headquarters facility at least 15 days prior to the first steam blow, and extend the offer to temporarily relocate them. Within five days of notifying these entities, the project owner shall send a letter to

the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) used to notify residents of the residence described above, and evidence of their acceptance or refusal.

Noise Restrictions

NOISE-6 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation to exceed 45 dBA L_{eq} measured at the residence at the Sonny Bono National Wildlife Refuge headquarters.

No new pure-tone components may be introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at the monitoring site near the residence at the Sonny Bono National Wildlife Refuge headquarters. This survey during power plant operation shall also include measurement of one-third octave band sound pressure levels at each of the above locations to ensure that no new pure-tone noise components have been introduced. If the results from the noise survey indicate that the power plant noise level (Leq) at the affected receptor exceeds the above value for any given hour during the 25-hour period, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity. Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to the Imperial County Planning Department, and to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey. Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-7 Following the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazard areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure. The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

Construction Time Restrictions

NOISE-8 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below: Monday through Friday 7:00 A.M. to 7:00 P.M., Saturday 9:00 A.M. to 5:00 P.M.; Sunday and Holidays Not allowed.

Heavy equipment operation and noisy construction work relating to any project features that would cause noise levels to exceed 60 dBA L_{eq} at the northern and eastern boundaries of the power plant site or 75 dBA Leq at the property line of the nearest residence shall be restricted as specified in Condition of Certification NOISE-4, above. Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

5.8.7 References

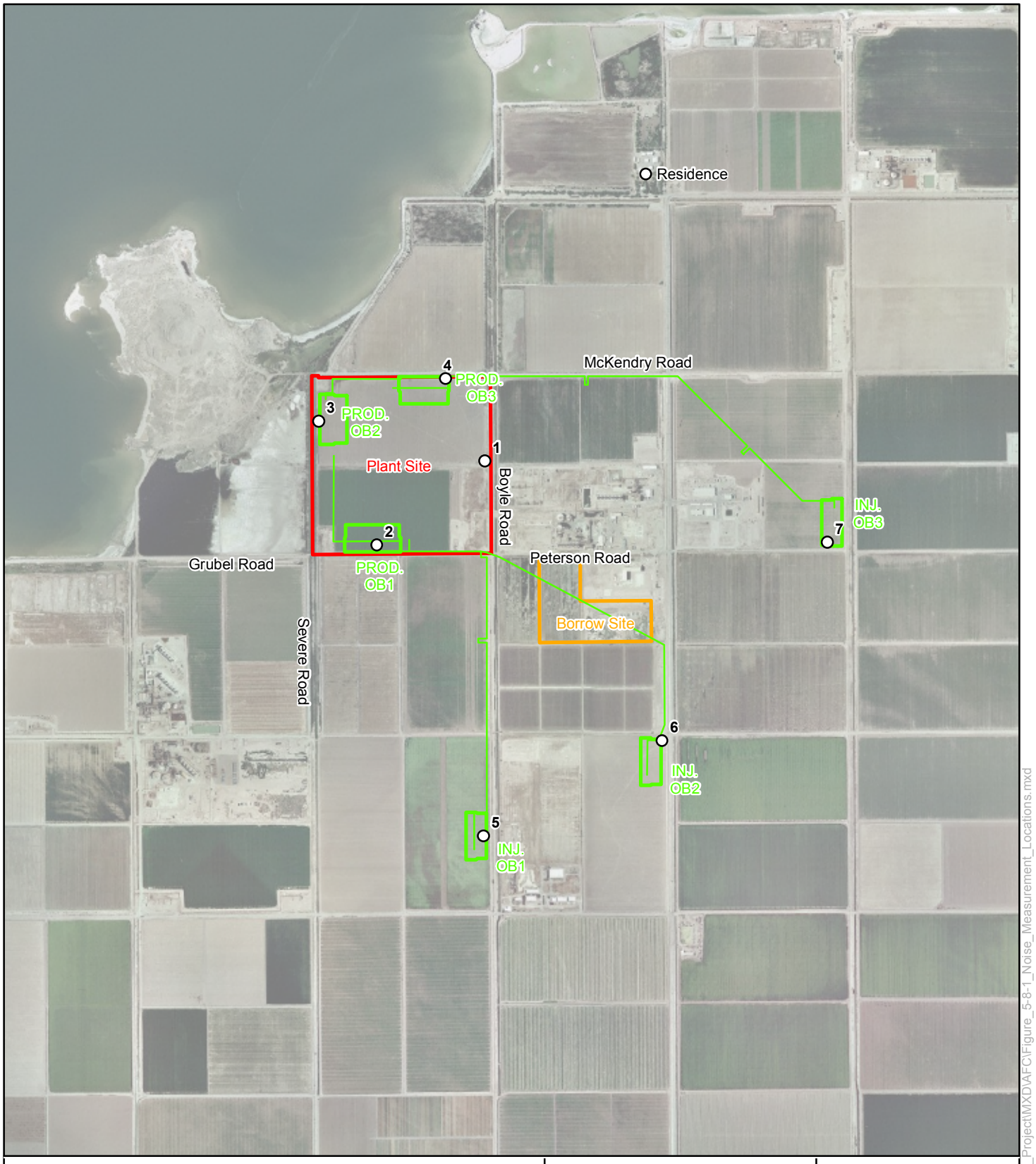
Imperial County, 2001. General Plan. Noise Element.

Imperial County, 2006. General Plan. Geothermal/Alternative Energy and Transmission Element. Adopted October 17.

Imperial County, 2002. Noise Ordinance. County Code, Division 7 (Noise Abatement and Control), Section 90702.00.

Thalheimer, Erich. 2000. Construction Noise Control Program and Mitigation Strategy as the Central Artery/Tunnel Project. Noise Control Engineering Journal. 48 (5), Sep-Oct

U.S. Environmental Protection Agency (USEPA), 1972. Construction Equipment Noise.



Legend

- Plant Site
- Proposed Well Pad
- Borrow Site
- Proposed Pipeline
- Noise Measurement Locations

N, W, E, S

1 inch = 2,000 feet

0 1,000 2,000 4,000 Feet

Amended SSU6 Project

Figure 5.8-1
Noise Measurement Locations

CE GENERATION LLC
A MIDAMERICAN ENERGY HOLDINGS COMPANY AFFILIATE

AECOM

Project: 12676-001
Date: February 2009

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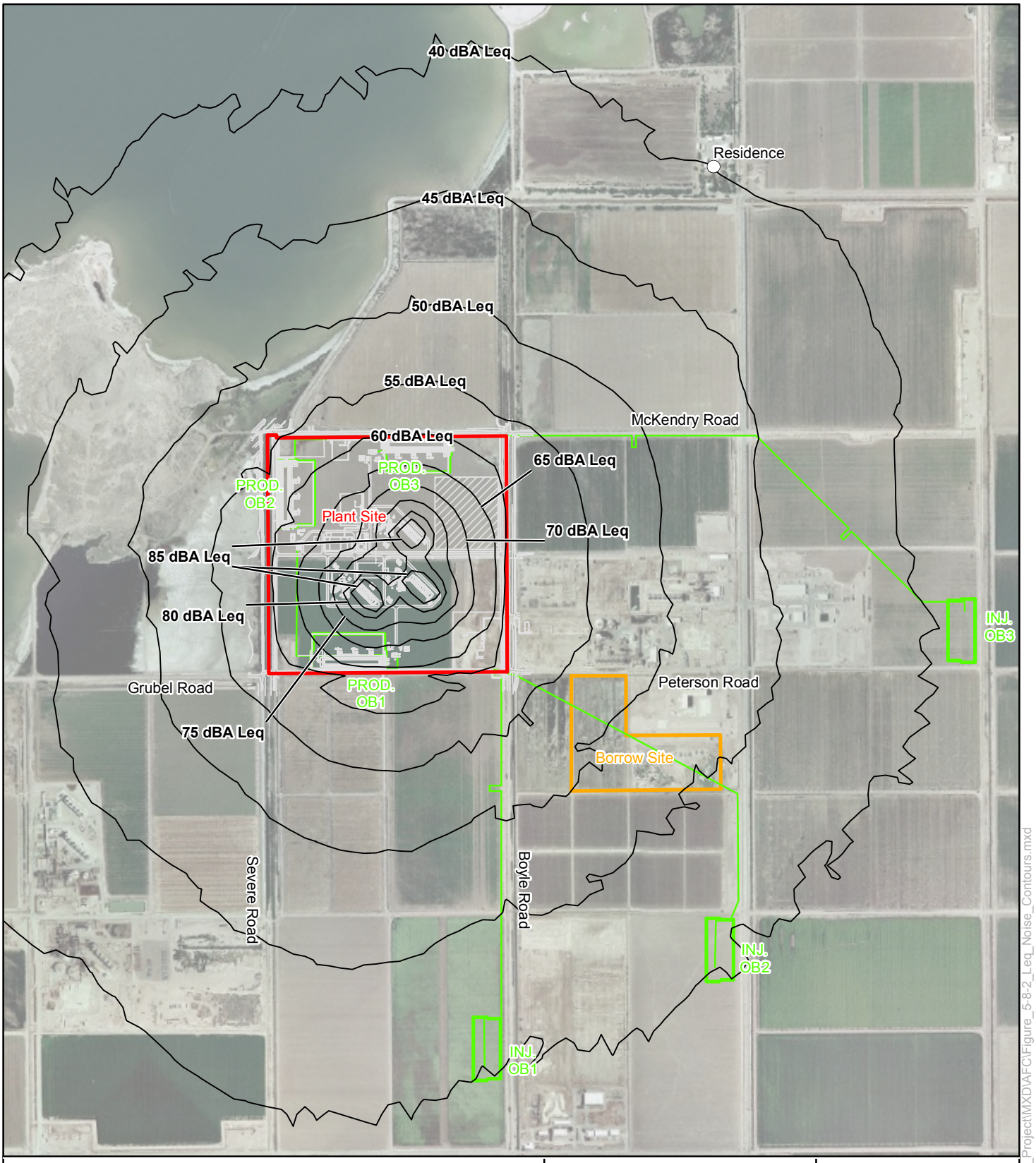

Legend

- Plant Site
- Borrow Site
- Proposed Well Pad
- Proposed Pipeline

1 inch = 1,500 feet

0 750 1,500 3,000 Feet

Amended SSU6 Project
Figure 5.8-2
Leq Noise Contours

CE GENERATION LLC
A MIDAMERICAN ENERGY HOLDINGS COMPANY AFFILIATE

AECOM

Project: 12676-001
Date: February 2009

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